Stormwater Ordinance

Comment & Response Document

Department of Public Works
Engineering Division

December 5, 2007
(Revised December 14, 2007)

city of greenville

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Office of the City Engineer

M E M O R A N D U M

Date: November 27, 2007

To: Planning Commission

From: J. William Brown, P.E.

Re: Stormwater Ordinance

Requested Action: Staff requests that the Planning Commission accept the attached revisions to the new Stormwater Ordinance and recommend adoption of the Ordinance by the Greenville City Council.

As a condition of the City of Greenville's Municipal Separate Storm Sewer System (MS4) Permit with the South Carolina Department of Health and Environmental Control, the City must adopt a new Stormwater Ordinance that meets the minimum requirements of the Federal Clean Water Act and the South Carolina Pollution Control Act. The proposed Stormwater Ordinance consolidates all regulations related to stormwater quantity and quality, and therefore meets or exceeds the State and Federal Standards. The Ordinance follows the premise of *No Adverse Impact* and establishes regulatory guidelines for meeting the policies and goals of the City's Stormwater Management Plan. The Ordinance's comprehensive standards are consistent with other regionally and nationally recognized stormwater and floodplain management programs, and are consistent with Greenville County requirements.

The new Stormwater Ordinance provides regulatory direction as to when a permit is necessary and the permit requirements. The Ordinance establishes performance standards related to stormwater runoff rates, runoff volume reduction, release rates, detention, conveyance, water quality treatment, buffers, and soil erosion and sediment control for all development. Particular considerations are given to special management areas such as floodplains, floodways, flood-prone areas, wetlands, riparian areas, and public roadways. The Ordinance also addresses the issue of illicit discharges, illicit connections, spills,

and other non-stormwater pollution related nuisances as required by the City's MS4 Permit.

Staff has solicited feedback and comments from design professionals involved in site development permitting as well as local development representatives. Outreach endeavors included three meetings where information regarding the Ordinance was presented and opportunities for discussion and feedback were provided, a public hearing, and information posted on the internet with a request for comments from the public. Attached is a summary of the comments that were received, along with a staff response to each comment. Based upon these comments, proposed revisions to the Ordinance were drafted and included in this document.

PREFACE

The following document contains two parts; Part I contains comments and responses, and Part II contains a summary of proposed changes.

Part I contains each of the written comments submitted to the City of Greenville regarding the proposed Stormwater Ordinance. Preceding each comment is a record of the author and date, and following each comment is a staff response providing technical justification, policy rationale, and/or documentation supporting the proposed ordinance. Potential modifications to the Ordinance are generally not acknowledged in Part I.

Part II contains a summary of recommended changes to the draft Ordinance based upon an inclusive review of all of the comments received.

Hughes Development Corporation

Robert E. Hughes, Jr.
September 4, 2007

Comment 1:
With regards to not making stormwater problems worse, "the ordinance appears to go to much farther, however, using its baseline 'predevelopment conditions' the conditions prior to 'European Settlement', i.e. before Columbus landed. ... Another way to look at this would be to say that the City is going to charge the upstream landowner for an improvement to the downstream landowners' property."
Response 1:
It is agreed that the proposed definition is conservative. This definition is proposed in absence of detailed analysis regarding appropriate watershed based release rates. The technical foundation for this definition is based upon the principle that stream geomorphology is based upon the bank full event. The continued degradation of streams is due to the stream mechanics trying to adapt to the new bank full event caused by more runoff due to urbanization. In order to return the rivers and streams to a "swimmable and fishable" state, as is the goal of the Clean Water Act, the hydrology needs to return to a pre-development condition. This definition would also address multiple situations throughout the City where there are downstream flooding problems. The source of a *downstream landowner's property* problem is the upstream contribution and this definition would protect the upstream property owner from liability issues related to damages to downstream properties.

Comment 2:
"The definition of 'development' includes repair or reconstruction. This apparently means that anyone repairing or reconstructing his property will become subject to this ordinance. ... While the Ordinance later exempts maintenance, the line between repair and maintenance is likely to be ephemeral, and as a result you will find people who think they are doing maintenance who are suddenly called to task for doing repair. ... Later in the definitions 'repair' is defined as an activity which does not result in an increase in the outside dimensions of a building or any changes to the dimension of a structure. Yet it is also defined earlier as 'development'. Perhaps this is simply a definitional conflict that needs to be addressed. ... The definition of 'development' also includes installation of utilities or drilling or similar projects. These too are items that, while they may create sediment, they will not change run-off characteristics and do not seem to be appropriate triggers for this Ordinance. ... The final definition of development being 'any other activity that might change the direction, height, volume or velocity of flood or surface water' confirms that the actual intent of the ordinance is to deal with the changes in the flow of water. Perhaps a better definition of development would be 'any activity that <u>does</u> change the direction, height, volume or velocity of flood or surface water.'
Response 2:
The definition of development is derived from the definition required for participation in the National Flood Insurance Program. It is derived from the Code of Federal Regulations (CFR) 44 § 59.1 definition. Since the ordinance is a comprehensive document addressing both stormwater quantity and quality issues, staff felt it would be inappropriate to have

two definitions of "development." The proposed Ordinance definition was developed to meet the minimum federal requirement while affording staff some flexibility in dealing with the situations identified in the comment.

Comment 3:
The definition of regulatory floodway uses a one-half foot rise in the flood. … The result of the one-half foot choice is a much wider floodway, rendering more property un-developable.
Response 3:
The floodway is an administrative tool that has no technical basis. It is generally acknowledged that the floodway is the portion of a stream or river where the water is deepest and fastest. While the floodway widths would be larger under the proposed definition, floodways are already subject to significant flood risk and flow velocities. The definition is consistent with floodway definitions in the region (Charlotte-Mecklenburg County, NC).

Comment 4:
The on-stream detention calculations and burdens seem to create a problem. I don't know of anyone else who has done on-stream detention, but we have done it in the County and I don't believe we could have done it had we had to meet these requirements.
Response 4:
Generally DHEC prohibits on-stream detention and initially requested a prohibition of on-stream detention. Staff felt that there were appropriate situations for on-stream detention and the provisions stated in the Ordinance were developed in conjunction with DHEC staff as a compromise for allowing on-stream detention. Any change in the language would jeopardize this option.

Upstate Forever
Jason Van Driesche
October 11, 2007

Comment 1:
A pre-development runoff standard is necessary. In a city where most development is redevelopment, the only way we're ever going to improve water quality and reduce flooding is to quit grandfathering redevelopment projects. We require a redevelopment project to come into compliance with current standards for just about everything else, from parking to ADA access to fire protection. Why not stormwater?
Response 1:
The comment is noted and no response is necessary.

Comment 2:
We need incentives for going beyond detention basins. Huge detention basins are a sign of a failure of imagination and lack of creativity, not of excessively stringent requirements. If a developer designs and implements an integrated, site-wide system of runoff reduction strategies, from narrow streets to underground cisterns to pervious pavement to bioswales, detaining and treating the remaining runoff to pre-development standards is entirely manageable.
Response 2:
The comment is noted and no response is necessary.

Comment 3:
Buffers are good for development. Buffers ensure that the high-quality resource that drives development along rivers in the first place -- an attractive, well-managed river corridor – is preserved for the long run. If we build right up to the rivers, they will no longer function as a draw for new businesses and residents, and a real economic opportunity will be lost.
Response 3:
The comment is noted and no response is necessary.

Comment 4:
A broad definition of the floodway is sound public policy. With development upstream of Greenville on the rise, flooding is likely to get worse before it gets better. Therefore, it makes sense to define the floodway so as to give the river a little more room, thus keeping people and property out of harm's way as flows continue to increase over the decades to come.
Response 4:
The comment is noted and no response is necessary.

Comment 5:
Fees in lieu of detention. Sometimes detention basins -- even small ones -- just don't make sense. For example, an infill project in an older neighborhood will be entirely out of character with the neighborhood if it includes a big hole in the ground with a chain-link fence around it. What's more, many portions of the city currently are old enough that they

have no stormwater management at all, and investing fees-in-lieu in stormwater improvements in the entire basin where the infill is located will often yield more water quality benefit at less cost than would requiring an infill developer to build a detention basin. The city should identify areas where fees in lieu of detention would be appropriate, set criteria for participation based on meeting runoff reduction targets, and then promote the program to the developer community as a sound strategy for improving water quality, reducing costs, and increasing buildable land.

Response 5:

Staff agrees with the comment. Fee-in-lieu of is a potentially valuable tool for the development community that would result in improved water quality and reduced flood risks. The City may evaluate the fee-in-lieu of detention concept in the future.

Comment 6:

Additional restrictions on allowable floodplain uses. There are all kinds of appropriate ways to use floodplain land, from city nature parks to greenway trails to backyard play areas. What doesn't belong in the floodplain, though, is anything that doesn't mix with water. As written, the ordinance does not prohibit storage sheds and associated uses in the floodplain. We see this as a serious oversight, given what is often stored in backyard sheds: gasoline, pesticides, fertilizer, and other toxic substances. If a storage shed floods, these chemicals end up in our water. Since no one is proposing that the city inspect the contents of people's backyard sheds, the only reasonable solution is to prohibit structures intended for storage within the floodplain.

Response 6:

The primary focus of the floodplain restrictions is to protect residential and commercial structures from flood damage. These provisions allow non-inhabitable accessory structures to be located in the floodplain; however, there are restrictions regarding uses of these accessory structures. It is acknowledged that there is a potential risk based upon material that may be stored in these facilities. A possible resolution to this issue is to require all chemicals, fertilizers, and petroleum (hydrocarbon) products stored in the accessory structures to be stored above the Base Flood Elevation.

Friends of the Reedy River

Robert Hanley
October 11, 2007

Comment 1:
The City needs to allow adequate time to review plans. The current 10-day review cycle is too short. The additional detail required by the proposed stormwater ordinance should be recognized by allowing longer review times for large, complex projects.
Response 1:
The proposed ordinance allows for a longer review cycle. The current 10-day review cycle is a policy decision.

Comment 2:
Stormwater review fees should be paid prior to the review. "Pay as you go" is a popular political phrase, and one that in this case would emphasize the importance of the review to applicants. Applicants should not be allowed to initiate work until they have an approved plan.
Response 2:
The comment is noted and no response is necessary.

Comment 3:
The stormwater review fee is too low for the amount of work required by City Staff. We suggest that the review fee be scaled based on the amount of review time required.
Response 3:
Following the adoption of the Ordinance, it is staff's intent to evaluate the stormwater review fees and policies and make new fee recommendations to the City Manager. The comment is noted and will be reviewed at that time.

Comment 4:
Fees should be charged for each review cycle.
Response 4:
The comment is noted and addressed in the previous response.

Comment 5:
Training for the regulated community should be included in the implementation of this ordinance. Many of the features of this ordinance may be unfamiliar to the regulated community. The City should offer training, which will improve the ordinance's efficacy and should improve the quality of submittals.
Response 5:
It may be premature to offer such training prior to approval of the Ordinance. At such time when the ordinance has been adopted, it is staff's plan to offer training to the design community. City staff has conducted some outreach to the design community to advise them of the pending changes and will continue to answer questions and provide clarification.

Comment 6:
Equally important, City staff should be adequately trained, to allow for efficient and accurate reviews of submittals.
Response 6:
The comment is noted and no response is necessary.

Comment 7:
The variance process needs to be rigorous.
Response 7:
The comment is noted and no response is necessary.

Comment 8:
Adjoining and immediately affected property owners should be notified in writing of proposed stormwater ordinance variances, and afforded an opportunity to comment on the proposed variance.
Response 8:
The comment is noted and no response is necessary.

Comment 9:
Variances should be approved by an appropriate governmental agency.
Response 9:
The comment is noted.

Comment 10:
The City should enforce both the 80% capture rate and the 0.5 ml/L settable solids concentration stormwater runoff water quality requirements. Too often, streams below construction sites are degraded by solids, even when the site achieves the 80% capture rate. The City should require measurable compliance determinations for all sites with ½ acre or more of land disturbance.
Response 10:
The comment is noted.

Comment 11:
Implementation of any ordinance is only as strong as support that City staff receives from elected and appointed officials. City Council and the Planning Commission need to show City staff that they agree to the need for and implement of this Stormwater Ordinance.
Response 11:
The comment is noted and no response is necessary.

Comment 12:
Weakening the ordinance, either through legislative actions or executive decisions, will not serve the public interest. It will, on the other hand, demonstrate a willingness to "bend the rules" in the interest of economic development, while sacrificing rules and regulations designed to protect all of Greenville's citizens.
Response 12:
The comment is noted and no response is necessary.

Arbor Engineering Inc.
Jay Martin, RLA, ASLA
October 22, 2007

Comment 1:
Article IV B.1.h.(1)(a)i.--in keeping with minimum buffers of SC DHEC, we believe that the minimum for the linear stream should be 25'. We recognize the need to increase the buffer on a channel for watersheds serving one square mile, but we believe the 25' buffer is adequate up to that one square mile watershed.
Response 1:
It is acknowledged that a minimum 25 foot buffer is typical for not only DHEC, but other agencies. For example, the Metropolitan North Georgia Water Planning District utilizes a 25 foot buffer but prohibits all impervious cover in that area. The intent here is to offer flexibility for impervious surface while maintaining the cumulative integrity of the buffer. Mecklenburg County and Charlotte, North Carolina, utilize a 30 foot stream buffer for all steams draining less than 50 acres. For areas greater than one square mile, they require a minimum of 100 feet or the entire width of a FEMA floodplain, which ever is greater. Staff feels that the flexibility provided by the proposed standards is balanced by the small incremental increase in buffer width and is consistent with other regional program standards.

Comment 2:
Article IV B.1.h.(1)(b)--Based off the same criteria that is used in the State of Maryland and other jurisdictions, we believe that the minimum buffers for water bodies and wetlands should not be based on the size of the water body or the wetland. Instead the buffer size should be determined by its connection to a system or isolation from a system. The buffer for an isolated wetland or water body of any size should be 25'. The buffer for a connected wetland or water body should be based on the criteria in Article IV B.1.h.(1)(a), Article IV B.1.h.(2), and Article IV B.1.h.(3).
Response 2:
As water body or wetland features increase in size, their potential beneficial functions for water quality and quantity increase, along with the potential for biotic interspersion. The proposed incremental increase in buffer size recognizes this fact. The proposed standard is less rigorous than similar standards in the Metropolitan North Georgia Water Planning District and other national stormwater programs. Again, the proposed standard is consistent with other programs while offering additional flexibility.

Comment 3:
Article IV B.1.i.(1)(d)ii.--We believe that the SC DHEC requirement is adequate and that matting should be required on 3H:1V slopes or greater when the vertical slope exceeds 8'.
Response 3:
Based upon experience and observations, Staff feels that slopes steeper than 25% need additional stabilization assistance to prevent erosion and slope failure. It is critical to stabilize these slopes as quickly as possible to prevent erosion. From a practical aspect, it the proposed standard will be more cost effective based upon the fact that slopes should not need to be regraded multiple times before stabilization is established.

Comment 4:
Article IV B.1.i.(1)(k)--We believe that a maximum of 2H:1V side slopes shall be allowed on commercial and industrial projects and 3H:1V side slopes shall be allowed on residential projects. Keeping that steeper side slopes may be constructed as approved.
Response 4:
Long term maintenance and stabilization of slopes steeper than 4H:1V is problematic. These steep slopes are difficult to maintain and can be a public safety issue. The proposed Ordinance offers a provision for slopes steeper than 4H:1V in the referenced section: "Steeper slopes may be constructed with appropriate stabilization as approved by the City Manager or designee."

Comment 5:
Article IV C.3.a.(5)(a)--We believe that a ten year monitoring time frame is unrealistic. We believe that monitoring and inspection should end after five years unless the mitigation has received a failing inspection during that time frame.
Response 5:
The provision allows for a monitoring period for up to ten years, but does not mandate ten years. It is agreed that five years will typically be an appropriate length of time, however the additional time will allow the City flexibility and protection for special considerations such as critical areas.

Comment 6:
Appendix A: Definitions--pre-development--We cannot agree with this definition as it is written. We do understand that the definition of pre-development may need to take into account some of our past "sins", but that this designation should be more watershed dependent than this definition. In other words, there are some areas where the pre-development as it exists has not caused issues down stream and has adequately dealt with even the 100-yr storm event. Arbor has designed to that standard for years. This definition will limit the develop ability of many previously developed sites. In fill projects and re-development in an urban setting needs to be strongly encouraged, but not crippled. We urge you to re-write this definition.
Response 6:
It is acknowledged that the proposed definition is conservative. The technical criterion for this definition is derived from the principle that stream geomorphology is based upon the bank-full event. The continued degradation of streams is due to the stream mechanics

trying to adapt to the new bank-full event caused by more urbanized runoff. In order to return the rivers and streams to a "swimmable and fishable" state, as a goal of the Clean Water Act, the hydrology needs to return to a pre-development condition. The intent of this proposed definition was to also address multiple situations throughout the City where there are downstream flooding problems. The source of a *downstream landowner's property* problem is the upstream contribution and this definition would help protect the upstream property owner from liability issues related to damage to downstream properties. It may be appropriate to redefine this provision such that pre-development is defined as the land use prior to develop or re-development, conditioned upon the downstream property's current ability to receive runoff without sustaining damages.

Greenville Planning Commission

Barry Nocks, Planning Commission Chair

Comment 1:

Currently the Planning Commission is involved with the variance process but the proposed Ordinance does not involve the Planning Commission. Is it appropriate to have the Planning Commission involved in the variance procedure and provide a Planning Commission Recommendation for variances to the City Council?

Response 1:

The NFIP establishes that variances can only be approved by the community; community is defined by 44 CFR §59.1 as "*any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization, or Alaska Native village or authorized native organization, which has authority to adopt and enforce flood plain management regulations for the areas within its jurisdiction."* By this definition, the current effective Ordinance is not compliant with the federal regulations. To that end this section places the ultimate responsibility for a variance on City Council as established and required by 44 CFR §60.6. In review of the process, it may be appropriate for the Planning Commission to be responsible for holding the public hearing for the variance and making a recommendation to the City Council. The process would be similar to the City's current zoning process.

Scott E. Powell, AIA
December 3, 2007

Comment 1:
I am in agreement with everything that I heard on November 16, with one exception. While I would hate for there to be damage to someone's property, I still feel that raising the finish floor elevation from 1' above the 100 year flood plain to 4' above the 100 year flood plain is too conservative.

Response 1:
The proposed Flood Protection Elevation is consistent with the standard currently in place in Greenville County. The current floodplain elevations are based upon analysis from the 1980's and do not reflect flood elevation increases as a result of growth in the region since that time. This proposed standard offers protection to new development from future impacts as the tributary areas continue to develop and grow resulting in increased flood risks.

McCall Environmental

Gene McCall:

Comment 1:
I don't like how it's organized; it's a hodge-podge mess. I don't even know if the ordinance applies to me yet, but I'm told about penalties and enforcement on page 2, though I'm not sure what "suspension from listing" means. There are separate penalties on page 3 (up to a $1,000 for violating a provision of this "division") and page 64 (up to a $1,000 for violating any requirement). Are these separate or cumulative?
Response 1:
The format is a change from the current format. It is intended to consolidate all stormwater related regulations into a single source. The enforcement and penalty provisions are consistent with current City Ordinance formats.

Comment 2:
Pg. 9 - MS4 requires application to 1 acre or more, the ordinance says more than 1 acre (not greater than or equal to); but then the ordinance may apply also to a ½ acre.
Response 2:
The current City standard requiring a stormwater permit is ½ acre. The thresholds have been reviewed and accepted by DHEC and are consistent with the City's MS4 Permit.

Comment 3:
Also on pg. 9 "New development on partially developed sites" (???) shall meet the release rate criteria in Article IV, Section B.1.c.(1)
Response 3:
This provision is established to prevent phasing of a development to avoid the stormwater requirements. This section will protect downstream properties from damage.

Comment 4:
Pg. 14 - Article IV, Section B.1.c.(1) says "release rates shall not exceed the 2-yr, 10-yr, and 100-yr pre-development release rates. (100 year means a really big detention pond) couple this with the Pre-development definition on pg 73 and you have a really big detention pond.
Response 4:
The Ordinance does not mandate detention facilities. While detention facilities are the common method for controlling release rates, there are numerous design alternatives that can be utilized to control runoff rates to a predevelopment rate.

Comment 5:
Pg. 17 - discusses "On-Stream Detention" DHEC generally will not allow on-stream detention.
Response 5:
It is agreed that generally DHEC prohibits on-stream detention. During initial discussions, DHEC requested a prohibition for on-stream detention. Staff felt that there were appropriate situations for on-stream detention. The provisions stated in the Ordinance were developed in conjunction with DHEC staff as a compromise for allowing on-stream detention.

Comment 6:
Pg. 22 - "Buffer areas shall be required" A 30 to 50' buffers shall be on each side of the channel. River Place could not have happened.
Response 6:
The statement is incorrect. A small portion of the River Place structure encroaches upon the proposed 50-foot buffer. The provisions allow for buffer averaging, thus the current structure meets the proposed standard. The only aspect of the River Place project that does not meet the proposed provisions is the 20% impervious area cap in the buffer, which could have been addressed through the use of pervious pavement or pavers.

Comment 7:
Pg. 32 - A bond (of unspecified amount) may be required by the City Manager. I think a bond is a good idea, but it should be required of everyone and for a pre-determined amount.
Response 7:
It is agreed that it should be required for all applicants. The amount is better served through a policy decision rather than a set regulatory amount. This will allow the City to adjust the bond amount based upon market conditions. It is likely that the bond amount will be a percentage of the cost of construction.

Comment 8:
Pg. 49 - No net loss of wetlands. An admirable idea, but I think this topic may be preempted by the Corps of Engineers and DHEC.
Response 8:
The proposed wetland portions of the Ordinance have been submitted to and reviewed by the Army Corps of Engineers and DHEC. DHEC has given approval of the proposed Ordinance and Army Corps of Engineers staff offered assistance to the City during Ordinance implementation.

Comment 9:
More to come; lots of necessary items missing relating to MS4.
Response 9:
No additional comments have been provided as of December 5, 2007. Regarding necessary missing items, DHEC staff have reviewed and support the proposed Ordinance.

Gray Engineering Consultants, Inc.
December 3, 2007

Comment 1:
The City of Greenville should only consider requiring proposed condition runoff to be equal or lower than the existing condition up to the 25-year storm. Per typical standards of engineering the 25-year, 50-year, and 100-year storm events occur after the ground is already saturated which results in 100% runoff during pre-developed conditions anyway. Standard modeling currently does not take this into account.
Response 1:
To the point regarding "typical standards of engineering", many methods of runoff estimation neglect important site specific factors and make simplifying assumptions in estimating runoff. The Rational Method is the most common over-simplification of the runoff estimation practice. On the Contrary, methods such as the Soil Conservation Service (SCS) Method accounts for abstractions such as interception losses, surface storage, water infiltration as well as considering land use information and antecedent moisture conditions to provide reasonable estimates for runoff. These methods have been in widespread use for more than 30 years and are widely accepted.

The South Carolina Department of Health and Environmental Control, Erosion and Sediment Reduction and Stormwater Management Regulation 72-106.E.1.j requires as a minimum standard "the use of the one hundred (100) year storm, as established by NOAA, and the rainfall time distribution that is expected to yield the most stringent design, to design structures, systems and improvements for:

1. permanent erosion and sediment control and stormwater detention/retention,
2. management of stormwater that originates outside yet flows through the site, and
3. locating buildings, utilities and other permanent facilities above the one hundred (100) year flood elevation."

This State of South Carolina Regulation has been in place since 1985.

Comment 2:
The City of Greenville also should limit the requirement to the 25-year storm not only for technical reason but also economical reasons. Greenville County requires detention to the 25-year storm while surrounding counties require to the 10-year storm. Putting such a requirement as the 50-year and 100-year storm on development in the City, while technically flawed, will impact development and land purchases in the City Limits.
Response 2:
It agreed as stated, that the current standards are technically flawed. As indicated above, the State of South Carolina Regulation's require an analysis including the 100 year storm. The 100-year requirement is consistent with current federal design and regulatory standards and is consistent with the City's policy of *No Adverse Impact*. Current standards regulate only 2- and 10-year events and essentially ignore the 100-year standard. Review of recent proposed developments in the City has shown proposed increases ranging from 30% to 45% in the 100-year post development flow rates. These same developments showed no increases in the 2- or 10-year events. The current policy impacts development and land purchases in the City. Absence of this proposed standard

puts undue hardship on adjacent property owners. Also, it potentially places damage liability on the City for land use decisions that adversely impact adjacent property owners. It should be noted that to date, the Verdae development projects have all been designed to the 100-year standard.

Comment 3:
The City Council and all decision makers should note that all these models are mostly based on theories and formulas. Historically engineers have developed plans that they know work based on actual performance. More credence should be given to the engineer's design rather than a relying on a checklist or definitive requirement.
Response 3:
There are performance standards that have been established by the Federal and State Governments and left to the Local Government to enforce. The models and checklists are designed to assist the design community in identifying requirements and basis for reviews. It also affords consistent standards and reviews for projects.

Comment 4:
Gray Engineering would definitely recommend development of a fee in lieu of detention for certain properties where detention is not merited. There are going to be certain properties where detention is not merited. In such cases the developer and city should have plan in place to handle and prevent undue delays in review.
Response 4:
As previously stated, the City may evaluate the fee-in-lieu of detention concept in the future. Staff agrees with the comment that it is a potentially valuable tool for the development community that would result in improved water quality and reduced flood risks.

Comment 5:
Volume controls are something that does not need to be required as there are limited sites with soils that are able to handle the large amount of runoff from these sites. When we provide wet detention ponds this is illustrated as the ponds generally remain wet at all times with marginal water surface changes unless during extreme drought. There is simply nowhere for the water to go.
Response 5:
The Runoff Volume Reduction Hierarchy (IV.B.1.d) requires the applicant to consider a strategy that will help reduce runoff. A hierarchical preference is provided, but it is acknowledged that each site dictates the appropriate method.

Comment 6:
Any language in the new ordinance requiring statements of "no adverse impact" due to development should be removed. Such statements are definitive and can mean a variety of things for different sites (i.e. flow increase as well as flow decrease could be considered an adverse impact). What Gray or the City consider adverse impacts may differ from what a downstream property owner considers adverse impact and could be used as basis of a lawsuit. More appropriate language may be "goal of reducing occurrences of downstream impacts" or "objective is to reduce impacts downstream of projects."

Furthermore, your language should be reviewed by your law team and a team of insurance providers to provide some clarity in what is actually insurable from a consultant perspective. Some of this language if required on plans may make the plan uninsurable.

Response 6:

The statement of "no adverse impact" does not appear in the proposed Ordinance. The term of "no adverse impact" appears in the City's Stormwater Management Plan and web pages, but is not include in the Ordinance language.

Comment 7:

Definition of pre-development: "Pre-development conditions for the purpose of this Ordinance assume land use conditions on December 22, 1997, unless a project master plan was approved by the City, Greenville County, or SCDHEC prior to December 22, 1997." This coincides with the effective date of the current ordinance.

Response 7:

As previously stated, it is acknowledged that the proposed definition is conservative. The technical framework for the definition originates in the principle that stream geomorphology is based upon the bank-full event. The continued degradation of streams is due to the stream mechanics trying to adapt to the new bank-full event caused by more runoff due to urbanization. In order to return the rivers and streams to a "swimmable and fishable" state, as a goal of the Clean Water Act, the hydrology needs to return to a pre-development condition. The intent of this proposed definition was to also address multiple situations throughout the City where there are downstream flooding problems. The source of a *downstream landowner's property* problem is the upstream contribution and this would protect the upstream property owner from liability issues related to damage to downstream properties. It may be appropriate to redefine this provision such that pre-development is defined as the land use prior to develop, re-development, or the current ordinance effective date, conditioned upon the downstream property's current ability to receive runoff without sustaining damages.

Synterra Corp.
Joe M. Barron, P.E.
November 15, 2007

Comment 1:
Explain "depressional storage area", we don't have glacial ponds or Carolina Bays. Is this storage areas upstream of existing road culverts or what? (IV.A.1.c)
Response 1:
The definition is included in the definition section of the proposed ordinance. It was defined as "Non-riverine depressions where stormwater collects."

Comment 2:
What is the difference between "hydraulically disturbed area" and "disturbed area" in DHEC regulations? If it is the same, I recommend using same term. (IV.A.1.f.3)
Response 2:
The term "hydraulically disturbed area" is not used in the proposed Ordinance. It is assumed that the comment was directed to "hydrologically disturbed area." This term is also defined in the definition section as: "An area where the land surface has been cleared, grubbed, compacted, or otherwise modified to alter stormwater runoff, volumes, rates, flow direction, or inundation duration." DHEC regulations use the term "disturbed area," but do not provide a definition. The definition is consistent with the DHEC definition for "land disturbing activity."

Comment 3:
Public Schools and State Colleges (Greenville Tech) must obtain DHEC permits even where cities have jurisdiction. Will this still be the case, if so wouldn't they be exempt from this regulation? (IV.A.2)
Response 3:
The comment is noted.

Comment 4:
Historically we have used the term Grading Permit, why not use this term instead of Earth Change Approval (the only jurisdiction I have heard of using that term). What is difference in "Earth Change Approval" and "Stormwater Permit" used elsewhere in the ordinance? (IV.A.4.b)
Response 4:
The intent here is to provide some flexibility in allowing applicants to start installing sediment and erosion control controls. The City currently serves in as the delegated reviewer for NPDES Permits. Approved permit information is forwarded to DHEC for final approval and issuance of the NPDES Permit. A City Stormwater Permit is granted after the receipt of the NPDES Permit. Under this Ordinance the applicants may start installing controls prior to the receipt of the NPDES Permit. These permits would be rare and very limiting in approved activities.

Comment 5:
The statement, "Earth change approvals may not be granted for any development within a regulatory floodplain" contradicts IV.C.1.b which concerns floodplain development. (IV.A.4.b)
Response 5:
Due to the additional risk of floodplain development, this permit option is not offered to activities in the floodplain.

Comment 6:
The requirement is for stormwater systems to be operational before building permits are granted. On many high density sites, the pipes and catch basins may be destroyed by the subsequent construction. Underground detention systems should come last so that they will not become silted up – above ground detention/sediments systems can be utilized first. (IV.B.1.A.5)
Response 6:
The stormwater system is considered to be part of the fundamental infrastructure. This schedule is consistent with other infrastructure such as the water and wastewater infrastructure.

Comment 7:
Mentions Technical Reference Manual: is this to be a new manual. Will it be reviewed and in place along with this Ordinance?
Response 7:
The City Standards are on a separate path and will be made available at a later date. The City will not be soliciting input on the standards. This process was conducted by the Greenville County Planning Commission approximately two years ago.

Comment 8:
Rainfall data does not meet DHEC requirements or Greenville County rainfall. Why does it rain differently when crossing invisible political boundaries? Little is gained by being different from DHEC. If for instance a school, or City project has to be reviewed by DHEC and the City chooses to review it also the detention calculations for one agency will not be accepted by the other based on past experience. (IV.B.1.b.2)
Response 8:
The South Carolina Department of Health and Environmental Control, Erosion and Sediment Reduction and Stormwater Management Regulations require the use of NOAA rainfall. The rainfall values in the proposed Ordinance are the Point Precipitation Frequency Estimates from NOAA Atlas 14, Volume 2, Version 3. The values published by DHEC are NOAA Atlas 14, Volume 2, Version 2 and have been superseded by Version 3. The City has chosen to use the current, effective, point precipitation frequency estimates.

Comment 9:
The phrase "existing depressional storage volume shall be maintained" is to limiting. If the storage is behind an old road culvert, the volume should be allowed to be substituted elsewhere if the runoff rates are the same. (IV.B.1.b.4)
Response 9:
The requirement is to preserve existing storage volume. Displacement of flood storage volume leads to increased flood risk downstream. The Ordinance does allow compensatory storage provisions.

Comment 10:
I question the use of the hydraulically disturbed area as the release rate areas of application. I have many sites where the release rate leaving the site cannot be separated into disturbed and non-disturbed portions. I think the upstream watershed and time of concentration should be the better way to protect downstream property owners from impact. (IV.B.1.c.1)
Response 10:
The Ordinance references the use of "hydrologically disturbed area." The upstream watershed and time of concentration are important components to the calculation. The requirement is structured such that the applicant is only responsible for maintaining the additional runoff generated by their project.

Comment 11:
I think I know what this is saying, but too me the paragraph contradicts itself. Maybe the work "except" needs to be added between the sentences. (IV.B.1.c.5)
Response 11:
The provision establishes that the combined discharges from a wetland and detention facility can not exceed the 100-year release rate. It establishes a special provision for wetlands where failure to exceed the release rate would have a detrimental effect on a wetland's hydrology. This provision allows for maintenance of wetland hydrology in order to protect and maintain the function of a wetland.

Comment 12:
Many times developers have tried to minimize road widths for stormwater purposes only to be rebuffed by the Fire Marshall or City/County rules. Will these rules be relaxed to meet the Stormwater Ordinance goals? (IV.B.1.d(1)(c))
Response 12:
The identified examples are all items that may be appropriate. Specific site conditions dictate the appropriateness of the runoff reduction.

Comment 13:
Water Quality: this appears to only permit water quality treatments involving detention of a certain volume to the exclusion of other innovative water quality treatment systems. I disagree with this approach. (IV.B.1.g)
Response 13:
This section includes the minimum requirements as set forth by the South Carolina Department of Health and Environmental Control Regulations. The volumetric requirements are as established by DHEC. The provisions also allow for and encourages innovative water quality treatment systems.

Comment 14:
If buffers for Waters of the State are required for waters that are on adjacent properties, how are these to be determined? The applicant does not have the authority to enter another person's property for delineation and survey purposes.
Response 14:
Similar to establishing watershed boundary limits, topographic maps, aerial photographs, field reconnaissance, and professional judgment can be used to establish the limits.

Comment 15:
The City does not use native vegetation in Cleveland Park, Falls Park and is not planning it along its trail system. Will the City change its management of these areas to set an example of what it is expecting of the private sector? (IV.B.1.h(9)(e))
Response 15:
The Engineering Division supports and endorses the use of native plantings. The Engineering Division will incorporate the use of native plantings into our projects where appropriate. We will work with the appropriate Departments to promote this practice.

Comment 16:
3H:1V slopes should be the cutoff for using a sod or mat. The term "staked in place" will prevent the use of great new green technologies such as mulch blankets from FilTrexx. (IV.B.1.i(1)(d)ii)
Response 16:
The requirement to be "staked in place" is to ensure that the sod, blankets, mats, etc. are held in place until such time as the vegetation is established.

Comment 17:
There should not be a requirement that storm inlets have inlet protection if there is a downstream sediment pond. I have seen several failures where water could not get into basins and pipes because of "protection": so it went overland down slopes and bypassed the sediment/detention ponds where it could have been handled. This is a good tool at time, but should not be a requirement. THIS RULE DAMAGES THE ENVIRONMENT! (IV.B.1.i(1)(g))
Response 17:
The issue as stated is a maintenance problem, not a design problem. The inspection and maintenance requirements of the NPDES Permit address this problem. It is acknowledged that failure to maintain the sediment control measures will lead to system failures, but the

City has observed significant problems due to the build up of sediment in catch basins and storm lines.

Comment 18:
Much of natural Greenville is more than 4V:1V slopes – you are outlawing the North Main and Country Club neighborhoods. Using flat slopes will cause much clear cutting and run afoul of the Tree Ordinance. (IV.B.1.i(1)(k))
Response 18:
This section applies to earthen embankments, not natural ground.

Comment 19:
If the City wants an endangered species act – pass one. Don't hide it in a stormwater ordinance. Does this require a biological study of every site? Who determine if there is an endangered species" Are there any possibilities of endangered species in Greenville that we should know about? (IV.B.2.a(11))
Response 19:
This is a disclosure requirement. If the applicant is aware of an endangered species or endangered species habitat, the presence must be disclosed to the City. The South Carolina Department of Natural Resources identifies 129 threatened or endangered species in Greenville County.

Comment 20:
If bonds must be required they should have a limit of one year from completion of the project – bonding companies will not bond unlimited time frames. A clear time frame is important to know how it will increase the cost of the project prior to construction. (IV.B.2.b(8)(k))
Response 20:
Warranty and performance periods are project specific. The required bond duration will be established based upon the project. This will afford the City the flexibility and security to insure project success.

Staff recommended changes based upon received comments:

Article IV. Section B.1.c

(1) Unless otherwise specified in Appendix H, a City of Greenville adopted basin plan or floodplain study, the detention volume required shall be calculated using a 24-hour storm event and release rates shall not exceed the 2-yr, 10-yr, and ~~**100**~~ *25* yr pre-development release rates. The release rate requirement shall apply to the hydrologically disturbed area of the ownership parcel unless the City Manager or designee determines that specific locations of the development site have unique circumstances *in which downstream capacity exists for receiving streams without sustaining damages.. In such cases* ~~**such that**~~ the release rate ~~**shall apply to a broader or smaller area**~~ *may be adjusted to match downstream capacity*. The release rate requirements shall only apply to developments listed in Article IV, Section A.1.f., and Article IV, Section A.1.g.

(3) *Extreme flood and public safety protection shall be provided by controlling and safely conveying the 100-yr, 24 hour storm event such that flood velocities are not exacerbated and flood elevations are not increased on adjacent properties.*

(~~**3**~~*4*) All concentrated stormwater discharges must be conveyed into an existing channel, storm sewer, or overland flow path with adequate downstream stormwater capacity (as defined in Appendix A) and ~~**will**~~ shall not result in increased flood and drainage hazard.

(~~**4**~~*5*) The design of stormwater management systems shall not result in the inter-basin transfer of drainage, unless no reasonable alternative exists. The City Manager or designee may also allow inter-basin transfers if the transfer relieves a known drainage hazard and there is adequate downstream stormwater capacity.

(~~**5**~~*6*) The combined release from the detention facility outlet and the outlet designed to meet wetland hydrology requirements shall not exceed the ~~**100**~~*25* year allowable release rate *and shall meet the extreme flood and public safety protection standards as listed in Article IV, Section B.1.c(3)*. The wetland hydrology requirement or minimum outlet restrictor size may take precedence over the allowable release rate, provided there is adequate downstream capacity as determined by the City Manager or designee.

(~~**6**~~*7*) The applicant shall prohibit illicit discharges generated during the development process from entering into the stormwater management system. Discharges of stormwater from a development site shall be in

conformance with the Soil Erosion and Sediment Control practices contained in Article IV Section B.1.i of this Ordinance.

Article IV. Section C.1.b(9)(f)vi

vi. The building shall be used only for the storage of vehicles or tools and may not contain other rooms, workshops, greenhouses or similar uses. *No chemicals, fertilizers, or petroleum (hydrocarbon) products shall be stored below the Base Flood Elevation.*

Article V. Section A.

2. A public notice will be issued inviting public comment on all proposed variances for major developments. *The Planning Commission shall hold a public hearing and make a ruling recommendation to the City Council.* The City shall publish a copy of the public notice 30 days before the ~~**ruling**~~ *public hearing* to allow for community comment.

4. Upon consideration of the *Planning Commissions recommendation,* factors noted above, and the intent of the Ordinance, the City Manager or designee may attach such conditions to the granting of a variance deemed necessary to further the purposes and objectives herein.

Appendix A: Definitions

extreme flood protection: Measures taken to prevent adverse impacts for large low-frequency storm events with a return frequency of 100-years or more.

pre-development: Pre-development conditions for the purpose of this Ordinance assume land use conditions prior to *the proposed development or re-development. In such cases where development is initiated prior to receiving appropriate Local, State, and federal permits, the land use condition will be assumed to be the condition prior to* European Settlement. *In this situation, the* ~~**The**~~ vegetative cover is assumed to be native forest.

The following recommendation was made and approved by the Planning Commission

Flood Protection Elevation (FPE): The elevation of the base flood elevation plus *two feet of freeboard required and* four feet of freeboard *recommended at the discretion of the Administrator or designee.*